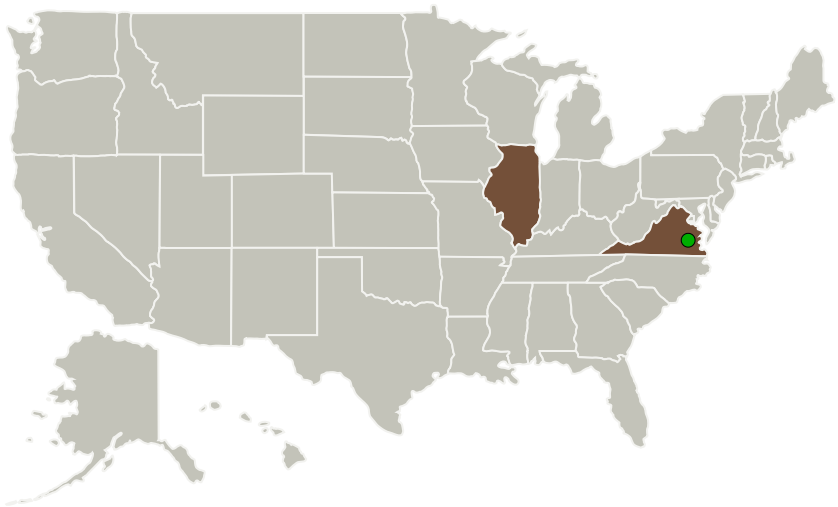
VIS-NIR Lightweight Spectrometer for the Sun and the Moon, Phase I

Completed Technology Project (2016 - 2016)

Project Introduction

EPIR Inc. and Brimrose Technology Corporation propose a miniaturized spectrometer covering the 0.35 to 2.3um wavelength range by integrating a Hg1-xCdxTe (MCT) - based photodetector (PD) with an acousto-optic tunable filter (AOTF). The goal is to achieve 4um spectral resolution with wide dynamic range to measure both the Sun's and the Moon's radiometric characteristics. Currently the best known infrared photon detectors used for spectroscopy are based on MCT. With an adjustable bandgap and little lattice mismatch, MCT photon detectors with high quantum efficiency are sensitive to a very broad spectral range. The proposing company, EPIR, is the leading small business in MCT growth, characterization and focal plane array (FPA) fabrication. The spectroscopic filter is an important component of any spectrometer. Compared with other technologies, e.g. Michelson or Offner interferometers, the proposed AOTF offers high spectral resolution, with the advantages of high speed, programmable waveband selection flexibility, and arbitrary wavelength step size. An AOTF has no moving parts and can be integrated with a MCT photodetector monolithically. The biggest advantage of the proposed spectrometer is its compact system design that reduced size, weight, and power consumption (SWaP), offering significant benefits to the payload as well as in the operation of missions.

Primary U.S. Work Locations and Key Partners



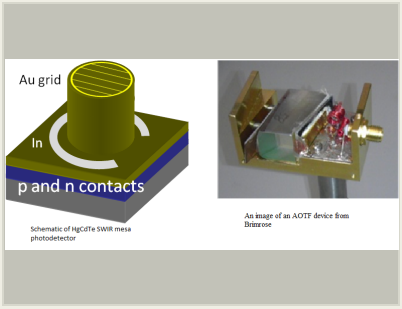


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Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

VIS-NIR Lightweight Spectrometer for the Sun and the Moon, Phase I

Completed Technology Project (2016 - 2016)

Organizations Performing Work	Role	Type	Location
EPIR Technologies, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Bolingbrook, Illinois
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Illinois	Virginia

Project Transitions

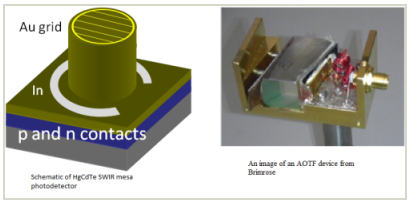
June 2016: Project Start

December 2016: Closed out

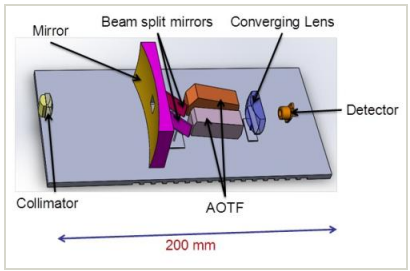
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139828)*

Images



Briefing Chart Image
VIS-NIR Lightweight Spectrometer for the Sun and the Moon, Phase I *(https://techport.nasa.gov/image/127795)*



Final Summary Chart Image
VIS-NIR Lightweight Spectrometer for the Sun and the Moon, Phase I Project Image *(https://techport.nasa.gov/image/130399)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
EPIR Technologies, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

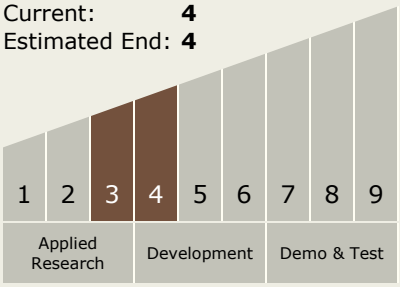
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Wei Gao

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Completed Technology Project (2016 - 2016)

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.3 Optical Components

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System